Appendix

The Continuing Story of the Computer Age: Past, Present, and Future

Important Points:
1. DESCRIBE THE GENERATIONS OF COMPUTER DESIGN LEADING UP TO THE PRESENT
   a. The First Generation
      i. 1951–1958
      ii. vacuum tube
      iii. magnetic core memory
      iv. storage on punched cards and tape
      v. machine language
      vi. UNIVAC (Universal Automatic Computer) – first computer built for business rather than military, science, or engineering
   b. The Second Generation
      i. 1959–1964
      ii. transistor
      iii. programming languages including assembly language, FORTRAN, COBOL
      iv. storage using removable disk packs and magnetic tape
      v. used primarily by business, universities, government
   c. The Third Generation
      i. 1965–1970
      ii. integrated circuit
      iii. upward compatibility
      iv. unbundled software
      v. several programs share computer’s resources
      vi. interactive processing
   d. The Fourth Generation
      i. 1971–present
      ii. microprocessor
      iii. explosive growth
      iv. found in homes
      v. the Internet revolution
         1. started as ARPANET – a network of computers that could survive a nuclear attack
         2. attractive to the average user
            • links
            • graphical browser
   e. The Fifth Generation (mid-1990s)
      i. intelligent computers/computer intelligence
         1. artificial intelligence
2. expert systems
3. natural language
4. robotics

2. DESCRIBE THE STORY OF PERSONAL COMPUTER DEVELOPMENT
   a. Apple (1975)
      i. home use
      ii. VisiCalc spreadsheet software
   b. IBM (1981)
      i. became industry standard
      ii. improved keyboard
      iii. 80-character screen
      iv. ability to add memory
      v. expansion slots
      vi. encouraged hardware and software development by others
      vii. nonproprietary parts
      viii. clones
   c. Microsoft/Intel
      i. Wintel
         1. Microsoft supplies operating system for PC – MS-DOS, Windows
         2. Intel supplies microprocessor
         3. primary standard
      ii. continually challenged – others making inroads
         1. handheld computers – Palm
         2. Linux – graphical user interface operating system
   d. The Internet Revolution
      i. Attractive to the average user
         1. links
         2. graphical browser
         3. explosive growth of PC market to support Internet use
   e. The Fifth Generation (mid-1990s)

3. EXPLAIN THE UNDERLYING CONCEPTS AND TERMS OF ARTIFICIAL INTELLIGENCE
   a. How computers can be used for tasks that require human characteristics
   b. How to make computers do things that people currently do better
   c. Make computers learn
      i. improve performance based on past errors
      ii. knowledge base – set of facts and rules
      iii. inference engine – applies rules to the facts to create new facts
      iv. evolving science
      v. subsets
         1. problem solving
         2. natural languages
         3. expert systems
         4. robotics

4. EXPLAIN THE FUNDAMENTALS OF EXPERT SYSTEMS, ROBOTICS, AND VIRTUAL REALITY
   a. Expert Systems
      i. software used with an extensive set of organized data that presents the computer as an expert on a particular topic
      ii. user
1. knowledge seeker
2. asks questions in English-like format
   iii. responds with an answer and explanation
iv. need
   1. expert system shell – software that contains the basic structure used to find answers to questions
   2. knowledge engineer – writes rules

b. Robotics
   i. computer-controlled device that can physically manipulate its surroundings
   ii. primarily found in factories
   iii. field robots
      1. dangerous work
      2. “dirty” jobs

c. Virtual reality (VR)
   i. engages a user in a computer-created environment
   ii. user physically interacts with computer-created environment
   iii. immersion – user becomes absorbed in the VR interaction
   iv. how it works
      1. alters perceptions
      2. appeals to several senses at once
      3. presents images that respond immediately to users movements

5. GIVE EXAMPLES OF THE IMPACT THESE FIELDS HAVE ON BUSINESS AND EVERYDAY LIFE
   a. Identify relationships in data and use the information to optimize profits
   b. Computer robots sent to do dangerous work in place of humans
   c. Using expert systems to assist with business decisions such as determining the best place to drill for oil or whether to invest in new stocks
   d. Use VR to simulate a showroom so customers at a distance can visit or to simulate a patient so doctors can try a new medical procedure

Review the Lecture Notes in particular

Chapter 1

Computers: Tools for an Information Age

Important Points:
1. DESCRIBE THE THREE FUNDAMENTAL CHARACTERISTICS OF COMPUTERS
   a. Characteristics
      i. speed
      ii. reliability
      iii. storage capability
   b. Results
      i. productivity
      ii. decision making
      iii. cost reduction
2. DESCRIBE AT LEAST FOUR AREAS OF SOCIETY IN WHICH COMPUTERS ARE USED
   a. Education & Training
   b. Business
      i. retailing
      ii. graphics
      iii. energy
      iv. money
      v. agriculture
      vi. paperwork
   c. Transportation
   d. Government & Law Enforcement
   e. Home
   f. Health & Science
      i. medicine
      ii. human connection
      iii. robotics
   g. Connectivity

3. IDENTIFY THE BASIC COMPONENTS OF A COMPUTER SYSTEM: INPUT, PROCESSING, OUTPUT, AND STORAGE
   a. IPOS cycle
      i. input
         1. data provided to computer
         2. converted to electronic form
      ii. process
         1. data is manipulated
      iii. output
         1. result of manipulation
         2. data is converted from electronic form to some other form
      iv. storage
         1. data and/or information is saved for future use
      v. IPOS is directed by software instructions but performed by the hardware
   b. Computer System
      i. hardware
         1. input devices
         2. processor / central processing unit (CPU)
         3. output devices
         4. storage / secondary storage
            − long term use
            − nonvolatile
         5. memory / primary storage
            − temporary use
            − volatile
      ii. software
         1. program
         2. set of instructions that tells the computer what to do
         3. basic types
            − system software or operating system (OS)
            − application software
iii. people
  1. technical individuals including computer programmers
  2. users

4. LIST SOME COMMON INPUT, OUTPUT, AND STORAGE MEDIA
   a. Input
      i. keyboard
      ii. mouse
      iii. scanner
   b. Output
      i. monitor
      ii. printer
   c. Storage Media
      i. magnetic disk
         1. uses magnetic disk drive for I/O
         2. examples
            − hard disk
            − diskette
      ii. optical disk
         1. uses optical disk drive for I/O
         2. examples
            − CD-ROM
            − DVD-ROM
      iii. magnetic tape
         1. uses tape drive for I/O

5. DISTINGUISH DATA FROM INFORMATION
   a. Data
      i. raw facts
      ii. provided to computer as input
   b. Information
      i. organized
      ii. useful
      iii. provided to the user as output

6. DESCRIBE THE SIGNIFICANCE OF NETWORKING
   a. Enables
      i. sharing of resources
      ii. communication
   b. Types
      i. local area network (LAN)
      ii. wide area network (WAN)

7. EXPLAIN THE SIGNIFICANCE OF THE INTERNET
   a. World-wide communication
   b. Collection of networks
   c. Unowned
   d. Used for
      i. communication
      ii. research
iii.  business functions
iv.  entertainment

8. EXPLAIN THE VARIOUS CLASSIFICATIONS OF COMPUTERS
   a.  Personal computer (PC) / microcomputer
       i.  low-end
       ii. fully functional
       iii. workstation
   b.  Notebook computer
   c.  Handheld computer
       i.  personal digital assistant (PDA)
       ii. pocket pc
   d.  Mainframe
   e.  Supercomputer

Review the Lecture Notes -- in the Chapter and pay close attention to:
   • Forging a Computer Based Society
   • Where Computers are Used
   • The Big Picture
   • Your Personal Computer Hardware
   • The Complete Hardware System
   • The Internet (Getting Connected and Getting Around)
   • Classification of Computers

Chapter 2

Applications Software – Getting the Work Done

Important Points:
1.  DISTINGUISH BETWEEN OPERATING SYSTEMS AND APPLICATIONS SOFTWARE
   a.  Operating systems
       i.  control the hardware
       ii. provide an interface between the hardware and the user
       iii. provide an interface between the hardware and the application program
   b.  Application software
       a.  applies to real-world tasks
       b.  solves user problems

2.  LIST THE VARIOUS METHODS BY WHICH INDIVIDUALS AND BUSINESSES ACQUIRE SOFTWARE
   a.  Packaged software/commercial software
   b.  Custom-written software
   c.  Freeware
   d.  Public-domain software
   e.  Open-source software
3. LIST AND BRIEFLY DESCRIBE VARIOUS TYPES OF TASK-ORIENTED SOFTWARE
   a. Word processing – create anything typed
   b. Desktop publishing – produce professional-looking documents for publication
   c. Electronic spreadsheets – manipulate numbers in rows and columns
   d. Database Management – store, update, sort, query, and report on data, making it information
   e. Graphics – create and edit pictures
   f. Presentation graphics – create professional-looking slide show presentations
   g. Communications – transfer data between computers
   h. Personal Information Managers – manage personal accounts
   i. Office Suites – group basic applications that are designed to work together

4. IDENTIFY THE KINDS OF SOFTWARE AVAILABLE FOR BOTH LARGE AND SMALL BUSINESSES
   a. Vertical market software
   b. Groupware/collaborative software
   c. Accounting
   d. Writing and advertising
   e. Customer service
   f. Business connections
   g. Presentation software

5. DISCUSS ETHICAL ISSUES ASSOCIATED WITH SOFTWARE
   a. Software piracy
   b. Counterfeiting
   c. Copyright issues

6. DESCRIBE THE FUNCTIONS OF VARIOUS COMPUTER PROFESSIONALS
   a. Data entry operators – key data into a machine-readable format
   b. Computer operators – monitor the computer
   c. Librarians – catalog and keep disks secure
   d. Computer programmers – write, test, implement, and maintain programs
   e. Systems analysts – plan and design computer systems
   f. Network managers – oversee the network
   g. Chief Information Officer (CIO) – manages his department; makes strategic decisions relating to the flow of information in the organization

Review the Lecture Notes -- in the Chapter and pay close attention to:
- Applications Software: Getting the Work Done
- Acquiring Software
- Some Task-Oriented Software (Database Management)
- Some Task-Oriented Software (Electronic Spreadsheets)
- Some Task-Oriented Software (Communications)
- Business Software
Chapter 3

Operating Systems – Software in the Background

Important Points:

1. Describe the functions of an operating system
   a. Manage the computer’s resources
      i. directs the hardware to perform tasks
      ii. controls the CPU, memory, disk drives, and printers
      iii. the user need not be involved with the details of the hardware
   b. Establish a user interface
      i. provide a method for the user to command the computer – command line or graphical user interface
      ii. interface between the user and the hardware
   c. Execute and provide services for applications software
      i. interface between the application program and the hardware

2. Explain the basics of a personal computer operating system
   a. An operating system and the specific set of hardware it uses is called a platform
   b. Application software is platform specific

3. Describe the advantages of a graphical operating system
   a. Command line
      i. text-based
      ii. memorization of commands and parameters is required
      iii. prompt – signal that the computer is waiting for you to provide an instruction
   b. Graphical user interface (GUI)
      i. desktop
      ii. visual images (icons) and menus activate operating system functions
      iii. use a mouse to point and click
      iv. intuitive
      v. nothing to memorize

4. Differentiate among different versions of Microsoft Windows
   a. Home/Consumer Market
      i. Windows 95 and Windows 98
         1. Plug and Play
2. object linking and embedding (OLE)
3. long file names
4. Internet/intranet browsing and reception of broadcasts
5. support for DVD and large disk drives
6. wizards
7. utilities

ii. Windows Me (Millennium Edition)
1. more multimedia support
2. automatically restores system files on reboot
3. automatic updates to installed system and applications software from the Internet
4. Home Networking Wizard

b. Business Market
i. Windows NT
1. written for a network environment
2. stronger security features
3. NT workstation and NT server

ii. Windows 2000
1. combines network ability (Windows NT) with ease of setup (Windows ME)
2. personalized preferences

iii. Windows XP
1. extends Windows Me and provides a more stable environment
2. network server – three versions based upon network complexity
3. desktop computer – two versions

iv. Professional Edition
1. file encryption
2. remote desktop access
3. dual processor support
   Home Edition
4. improved desktop interface
5. better multimedia support
6. personalized Windows components
7. support for simultaneous users

d. Windows.NET
i. an upgrade to Windows 2000 Server
   ii. four versions designed for different levels of network complexity
      iii. allows easy development of Web-based software

c. Pocket computers and Internet appliances
i. Windows CE (Consumer Electronics)
1. subset of Windows – provides Windows-like interface
2. less memory, smaller screen, little file storage
3. provides Internet connectivity
4. used in embedded systems
   d. Other important operating systems
      a. Mac OS
      b. UNIX
      c. LINUX

5. EXPLAIN THE NEED FOR NETWORK OPERATING SYSTEMS
   a. Permits sharing of resources such as hard disks and printers
   b. Supports data security
   c. Facilitates troubleshooting
   d. Provides administrative control
   e. Makes the resource appear as if local to the client computer

6. DESCRIBE THE METHODS OF RESOURCE ALLOCATION ON LARGE COMPUTERS
   a. Sharing the CPU
   b. Memory management
   c. Sharing storage resources
   d. Sharing printing resources – spooling
   e. Utility programs

7. BE ABLE TO DESCRIBE THE DIFFERENCES AMONG MULTIPROCESSING, MULTIPROGRAMMING, AND TIMESHARING
   a. Multiprocessing – more than one CPU is processing data simultaneously
   b. Multiprogramming – more than one program can be open at a time, but only one has the attention of the CPU at any given moment
   c. Time-sharing – multiprogramming that operates in a multi-user environment. The computer only works on users’ tasks during their allotted time slice.

8. EXPLAIN THE PRINCIPLES OF MEMORY MANAGEMENT
   a. Keep instructions and data separate in memory for each program
   b. Partitions or regions
   c. Foreground and background
   d. Virtual storage/virtual memory
   e. Memory protection

9. LIST SEVERAL FUNCTIONS TYPICALLY PERFORMED BY UTILITY PROGRAMS
   a. Organize and manage files
   b. Backup and restore
   c. File compression
   d. Disk defragmenter
   e. Communicate with peripherals via device drivers

Review the Lecture Notes -- in the Chapter and pay close attention to:
- Operating Systems: Hidden Software
• Resource Allocation: Sharing the Central Processing
• Resource Allocation: Sharing Memory
• Utility Programs (Defragmenter, Device Drivers, etc.)

Chapter 8

The Internet at Home and in the Workplace

Important Points:

1. BRIEFLY DESCRIBE THE HISTORY OF THE INTERNET
   a. ARPANET
      i. debuted in 1969
      ii. U.S. Department of Defense and Rand Corporation
      iii. Cold War – fear that a bomb could demolish computing capabilities
      iv. several computers, geographically dispersed, networked together
      v. plan – if one computer was disabled, others could carry on using
         alternative communication routes
      vi. messages divided into packets
      vii. TCP/IP
         1. TCP – does the packeting and reassembling of the message
         2. IP – handles the addressing
      viii. joined research computers from universities and defense contractors
      ix. needed technical expertise
   b. Tim Berners-Lee
      i. created World Wide Web in 1990
      ii. perceived a spider’s web of computers with links from computer to
         computer
      iii. CERN site
         1. Dr. Berners-Lee’s physics laboratory
         2. birthplace of the World Wide Web
      iv. easy movement through links
   c. Marc Andreessen
      i. created browser software in 1993
      ii. Mosaic – first browser
      iii. provided attractive images and a graphical interface
   d. ARPANET becomes the Internet
      i. TCP/IP software is public domain
      ii. network became more valuable as it embraced other networks
   e. Internet Explosion
      i. mid-1990s
      ii. estimate over 333 million users worldwide
      iii. part of our daily lives
      iv. four factors
         1. TCP/IP standard
         2. ability to link from site to site
         3. ease of use of browser
         4. growth of PCs and LANs that can connect

2. EXPLAIN WHAT IS NEEDED TO GET ON THE INTERNET
   a. Computer with a modem or NIC
b. Related software

c. Internet service provider (ISP)

d. Browser

3. DESCRIBE GENERALLY WHAT AN INTERNET SERVICE PROVIDER DOES
a. Provides a connection to the Internet
i. server computer
ii. software

4. DESCRIBE THE RUDIMENTARY FUNCTIONS OF A BROWSER
a. Software used to explore the Internet
b. Dials the ISP
c. Displays the home page
d. Provides status information as you move around the Internet
e. Permits you to specify an Internet location (URL) to visit
f. A URL starts with the protocol \textit{http}, which stands for HyperText Transfer Protocol
g. \textit{http} is the means of communicating by using links, the clickable text or image that transports a user to the desired Web site
h. Domain name is the address of the site’s host computer
i. May offer support for mail, security, collaboration, and Web page authoring
j. Supports plug-ins, applets, and ActiveX controls
k. Wireless Internet Access
i. very often uses the Wireless Application Protocol (WAP)

5. DESCRIBE HOW TO SEARCH THE INTERNET
a. Search engine
i. search request specified
ii. results presented
b. Metasearch – same request to several search engines

6. LIST AND DESCRIBE THE NON-WEB PARTS OF THE INTERNET
a. Newsgroups/Usenet – posting and reading of messages that focus on specific topics
b. FTP – download files to your local computer and upload files to another computer
c. Telnet – use your PC as a terminal providing remote access to another computer
d. E-mail – send written messages to others

7. DESCRIBE THE VARIOUS TYPES OF E-COMMERCE
a. B2C – businesses sell products directly to consumers
b. B2B – one business provides another business with the materials and supplies it needs to conduct its operations
c. C2C – users sell to other users through online auction sites

8. DISCUSS E-COMMERCE PAYMENTS AND TAXES
a. E-commerce payments
i. uses Secure Sockets Layer (SSL) protocol
b. E-commerce taxes
i. 1998 Internet Tax Freedom Act

9. DESCRIBE HOW ADVERTISING IS DONE ON THE INTERNET
a. banner ads
b. pop-over ads
c. pop-under ads

10. DIFFERENTIATE BETWEEN INTRANETS, EXTRANETS, AND VIRTUAL PRIVATE NETWORKS
1. Intranet
a. private network
b. can be linked to Internet

2. Extranet
   a. provides access to intranet to selected customers and suppliers
   b. replacing EDI

3. Virtual Private Networks (VPN)
   a. use public Internet as a channel for private data communication
   b. use the Internet rather than private phone lines to access company network

Review the Lecture Notes -- in the Chapter and pay close attention to:

- A Quick Timeline
- Tim and Marc
- A Little About the Technology
- Browser Functions and Features
- Telnet: Using Remote Computers
- FTP: Downloading Files
- E-Mail
- Business-to-Consumer E-Commerce
- Portals and Advertising
- Virtual Private Networks